

## **REMARKS**

Applicant's invention is directed to a beating device for refining pulp, in particular, a web of pulp. This is different from compressive or refining devices that break down or refine wood chips. Although both chips and pulp are fibrous, chips are relatively large, discrete, hard, chunk-like material that when aggregated form a flowable mass. In contrast, a pulp web is a somewhat consolidated, sheet-like suspension of fibers that have already been separated from the chips. Whereas chip destruction and chip refining occurs at the upstream end of the overall paper making process, refining of a pulp web occurs later in the process.

According to the on-line Pulp and Paper Dictionary at <http://www.paperonweb.com/dict11.htm>, "pulp" is "a suspension of cellulose fibers in water", and a "web" is "a term used for the full width of the paper sheet in the process of being formed, pressed, dried, finished and/or converted." Therefore, it should be understood that a "pulp web" is a suspension of cellulose fibers in water guided or formed as a sheet in the course of making paper. (This does not necessarily mean that the pulp web as refined according to the invention directly emerges as a paper web).

The application presently contains claims directed only to apparatus. The two independent claims 7 and 28 have been amended to more clearly recite features that limit the apparatus to the refining of a pulp web. This is supported by now-cancelled claim 22 and at, e.g., the first full paragraph on page 3 of applicant's specification. As is discussed in the third full paragraph on page 3, the pulp is thus substantially uniformly and evenly distributed when it is subjected to the compressive beating action. The large surface area together with the very even fiber distribution in cross section, longitudinal, and Z directions, leads to a high fiber hit probability with the advantage of even fiber treatment, while utilizing the strength potential of as many individual fibers as possible.

As described in the last three paragraphs on page 8, the untreated web fed into the beating or refining zone can have a wide range of weight (e.g., 100-1500 g/m<sup>2</sup>) and degree of fiber consolidation (low to high consistency). At low consistencies (<10% dryness), a web-forming guide is situated at the feed of the beating refiner, whereas at

high enough consistencies (25-65% dryness) the web is self-supporting as conveyed to the entry of the beating refiner.

Claims 7-11, 15-19, 21, 22, 28, and 29 stand rejected as anticipated under 35 U.S.C. §102(b), based on the disclosure of newly-cited U.S. Patent 4,953,795 (Bielagus). Applicant respectfully traverses. Bielagus is directed to a chip crusher, not to a beater for pulp, especially a beater for pulp webs. Bielagus treats chips (by oriented size reduction) to improve receptivity to subsequent pulping (see col. 1, lns. 5-11). Moreover, the motivation for Bielagus is to improve chip uniformity, and thus improve uniformity of subsequent delignification of chips in a digester. The device of Bielagus does not receive separated fibers nor does it separate fibers from the chips to the extent that the individual fibers are subjected therein to beating or refining. Another, downstream device (digester) will produce pulp from the crushed or cracked chip material discharged from the device of Bielagus. (see col. 2, lns. 55-65).

As applicant noted in the previous Response, the dictionary at [www.paperonweb.com](http://www.paperonweb.com) defines "beating or refining" as "the mechanical treatment of the fibers in water to increase surface area, flexibility and promote bonding when dried" (emphasis added). A pulp suspension or pulp web according to applicant's claims already contains separated fibers, not chips. It is much smoother and cannot be crushed by beating the fibers in itself, especially to get better strength properties of the final paper product. Applicant's claimed invention is structurally different from Bielagus, operates on different feed material (pulp web vs. chips), and discharges a different output material (refined pulp web vs. fractured chips).

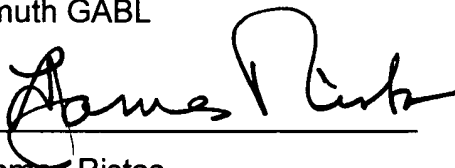
Claims 12-14 and 23 stand rejected under 35 USC §103 as unpatentable relative to Bielagus. In Bielagus the very aggressive structure on the surface of the crushing rolls is designed to fracture the chips. Although some compression may precede the fracturing, there are no liberated fibers and any such compression cannot refine fibers. Given that Bielagus has a different structure for solving a different problem to produce a different output material, applicant submits that one of ordinary skill in the field of beater refining would not see reason to look to Bielagus for either the basic features recited in applicant's independent claims, or any dependent claims such as 12-14 and 23.

Claims 20, and 24-26 were rejected under 35 USC §103 as unpatentable relative to the combination of Bielagus and US 4,826,555 (Long). Without applicant's own specification as a blue print, one of ordinary skill would have no reason to incorporate Long's conveyor belt anywhere into the chip crusher of Bielagus. The device of Bielagus has a wide hopper for receiving an unguided flow of randomly sized and spatially distributed chips from screw feeder 12. There is no need for the chips to be fed or guided by a conveyor into the crushing zone between the first set of rolls 40,42. The chips fall by gravity, and can bounce and then settle into the crushing zone, without the need to remain consolidated into a web at entry into or through the crushing zone.

Given that the basic reference cited by the examiner is directed to a different type of equipment and process, for a different purpose, and cannot be used for beating or refining, and that none of the secondary references teaches or suggests apparatus or method for beating or refining, applicant's claims are neither anticipated nor rendered obvious under 35 U.S.C. §102 and 35 U.S.C. §103.

This paper is filed during a one-month extension of the shortened period for response; the petition fee is enclosed herewith. Inasmuch as no new claims have been added and one claim has been cancelled, no fee for extra claims is required.

Respectfully submitted,  
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